U.S. Security Strategy and the Gains from Bilateral Trade[1]

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Abstract

We explore the geo-strategic determinants of bilateral trade flows between the U.S. and the rest of the World. We develop a three-party model of security and trade patterns and use data on military assistance and troop deployments on the 1950-2009 period to validate its predictions. We find that security assistance has significant, positive impacts on the shares of bilateral trade between the U.S and the recipient country, results that are robust to issues of reverse causality and hold across different sectors.

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1. Introduction

To what extent are bilateral economic ties affected by the type and quality of diplomatic relations? Our paper focuses on the effect of U.S. foreign-policy goals, in particular its security concerns, on the shares of bilateral trade between the U.S. and the rest of the world. The U.S. has deployed more forces abroad than any other military in the world history; it is also the largest contributor of military aid to friends and allies. Since their end-use concerns one of the most sensitive issues in international relations i.e. the security of the recipients, we can use them as a barometer of political relations between the U.S. and the recipient states and as an active component in influencing their relations.

We consider a three-party model of production and trade in a context of security concerns and propose a mechanism whereby more security creates a business-friendly environment, thereby spurring trade. Our empirical analysis finds that both instruments of foreign policy (troops and weapons) positively affect the shares of bilateral trade between the U.S and the recipient country, results that are robust to compelling issues of endogeneity and across different sectors.

Much previous research on the topic points at foreign policy goals as drivers of trade by looking at the relation between trade and the likelihood of military contests between pairs of countries. A growing empirical literature supports the Liberal "Kantian Peace" claim that trade among nations leads to peace (e.g. Dorussen, 2006; Dorussen & Ward, 2010; Gartzke, 2007; Hegre & Russett, 2010; Jinjarak, 2009; Oneal & Russett, 1999; Polachek, 1997; Russett & Oneal, 2001). Most of the findings suggest that countries that engage in trade are less likely to go to war with commercial partners.[2] Bilateral trade improves also the prospects for mediation between antagonists (Böhmelt, 2010). Trade has equally been shown to spur the development of institutions, the destruction of which would generate sufficient costs for individuals to opt instead for peaceful livelihoods (Jha, 2013). Interestingly, Martin *et al.* (2008b) suggest that higher trade flows may not necessarily lead

[2] See Mansfield & Pollins (2001), Schneider et al. (2003), Polachek & Seiglie (2007) and Polachek (2011) for exhaustive reviews of this literature.

to more peaceful relations, because what matters ultimately is the geographical structure of trade and its balance between bilateral and multilateral openness. Also, Stefanadis (2010) demonstrates that the peace-promoting effect of trade is conditional on the presence of strong institutions, with trade openness in weak institutional settings spurring violent behavior. Finally, Martin *et al.* (2012) maintain that trade benefits and the geopolitical factors that impede the initiation of conflict work as complements in the development of free trade agreements and in the production of peaceful outcomes.

In a similar vein, a smaller number of studies evaluate the effects that conflict has on trade. A trade-disrupting effect of war is empirically well grounded in both the economic literature (e.g. Blomberg & Hess, 2006; Glick & Taylor, 2010; Martin *et al.*, 2008a) and the political science literature (Keshk *et al.* , 2004; Mansfield & Bronson, 1997; Pollins, 1989). Yet, a consistent number of studies find that the effect of conflict on trade is not statistically significant (Mansfield & Pevehouse, 2000; Morrow *et al.*, 1998, 1999). As Glick & Taylor (2010) point out, the absence of any uniform conclusions may be attributable to methodological differences in terms of sample characteristics. These studies usually restrict their samples to politically relevant cases - i.e. country pairs involving one or more major powers or geographically contiguous states - and exclude country pairs that are unlikely to engage in conflict. This sample restriction introduces the possibility of bias in the selected sample.

We focus on one country, the United States, which is the world's largest trading nation and one of the hegemonic powers since the end of World War II (WWII). While there is much observable evidence to attest to this hegemonic role (e.g. voting power at the IMF, veto power in the UN Security Council, the size of its economy and its defense budget), the U.S. foreign policy has been the subject of much debate both domestically and abroad. Among others, two particularly expensive diplomatic tools signal U.S. commitment to a particular region: the deployment of troops and the disbursement of military aid in the form of money and weapons to friends and allies.

Much of what has been written in recent years on the subject of U.S. troop deployments abroad and U.S. military aid deals with the original aims, strategic needs and decision-making processes (Kemp, 1994; Meernik *et al.*, 1998; Poe & Meernik, 1995). Important and novel

exceptions are Biglaiser & DeRouen Jr (2007), Biglaiser & DeRouen Jr (2009) and Jones & Kane (2012), who look at the impact of U.S. troop deployments on trade, foreign direct investment and growth. However, as we will see in the next paragraphs, both our theoretical approach and empirical strategy stand in sharp contrast to their works on troop deployment.[3]

How exactly does the U.S. security strategy affect the level of bilateral trade? Before getting to the data, we analyze a simple three-party model of production and trade in a setting of security concerns. While earlier research has proposed theories linking trade to conflict (Anderson & Marcouiller, 2005; Garfinkel *et al.*, *al.*, 2008; Reuveny & Kang, 2003; Skaperdas & Syropoulos, 2001, 2002), our framework differs significantly in the way trade maps into conflict. A host[4] country's government faces a strategic opponent and decides its militarization level, given some military aid provided to the former. We show that increased military assistance favours trade by enhancing the security of business activities in the host country, while also reducing the required tax rate on the productive sector to fund the security forces.

In a recent article, Drezner (2013) argues that providing security by acting as the dominant security actor does not pay-off in terms of what he calls *geographical favouritism,* i.e. providing voluntary economic concessions to the hegemon. Yet, that contribution is not backed by hard data. The contribution of Berger *et al*. (2013) on the other hand shows how increased political influence - in that case arising from CIA interventions during the Cold War - created a larger foreign market for American products in the intervened country. Compared to Berger el al. (2013), our paper is exclusively about overt interventions. Moreover, while instances of foreign leaders directly installed by CIA or covert support for the regime once in power show a form of subjection of the intervened country, we theorize a much different

[3] In fact, we do not use the levels of bilateral trade but the relative flow and differentiate between the *shares* of total import and export; provide industry level results to explore whether US exports are mainly driven by military products; offer an additional measure of foreign policy (i.e. security provision through military aid); provide a formal framework to identify the channels and the main causal mechanism linking the provision of security to trade; deal with the problem of omitted variables bias and tackle the problem of reverse causality through instrumental variables; and focus on all the world's countries (i.e. not only developing countries) vis-a-vis the U.S.

[4] We use "host country" and "recipient country" interchangeably, to indicate the place where U.S. troops are stationed and/or the beneficiary of military assistance.

mechanism where a more peaceful environment boosts an economy's productive sector, thereby stimulating trade. Accordingly, we find important effects of security provision on the shares of export from the intervened country to the U.S., in contrast to their findings, and across a number of different sectors. Finally, we do not use dummies for intervention but *continuous* measures (i.e. the quantity of troops and weapons), which are a more effective way to rank the intimacy of relations between the U.S. and the recipient countries. Along similar lines, Head *et al.* (2010) explore the erosion of colonial trading ties after colonies reached independence, thus shedding light on the colonial commercial subjection of these territories.

The effects of security on international trade are estimated using a gravity model of international trade, whose standard form is the benchmark empirical model for this kind of exercise in the international economics literature. We augment it with a number of important explanatory variables to increase the predictive power of the model. A fair criticism would be to point at the endogeneity problems plaguing the trade to military assistance dynamics. We address this issue by including country fixed effects and time effects using lagged value of troop deployment and military aid and by implementing an instrumental variable strategy. Finally, to exclude the possibility that only some specific industries are affected by U.S. military assistance, in particular those related to the defence sector, we run industry-level regressions.

The next section provides an overview of troop deployment and military aid and explains why they reflect U.S. national security goals. Section 3 develops a simple model to formalize the possible channels linking security provision to trade while Section 4 presents the data, discusses the empirical strategy and reports our main empirical results. Lastly, Section 5 concludes.

2. Beyond MIDs: Weapons, Aid and Troops

Since the late nineteenth century, the "provision of security" - to use a catchall phrase for all defense material and troops - has become one of the key elements influencing the nature of international relations. In order to establish a theoretical and empirical base from which

to analyze the impact of the U.S. security strategy on the level of bilateral trade, we first need to define some of the "U.S. security supplies" since the end of WWII. Our inventory covers military aid, including weapons transfers, training programs and support services, and the deployment of troops.

U.S. arms transfers are of particular interest: "most American statesmen have traditionally regarded arms transfers as a necessary adjunct of national policy and strategic doctrine. They would argue that, from a long-term historical perspective, arms sales and military assistance programs have been beneficial to American strategic interests" (Kemp, 1994, p.147).[5] In fact, with few exceptions, sophisticated weapons are usually given only to close allies. Cases of arms denial - i.e. when the U.S. turns down a request for arms - and the constraints on arms transfers are a natural way to rank the intimacy of relations between countries. This means that the instances of no assistance contain important information.[6]

The U.S. uses three major channels to deliver major weaponry to foreign countries: foreign military sales ("FMS"), in which a government-to-government agreement is negotiated by the Pentagon; direct commercial sales ("DCS"), in which the industry negotiates directly with the purchasing country and must apply for a license from the State Department; and military aid, which allows the U.S. government to give away weapons from U.S. military stocks for free or at greatly reduced prices by resorting to what is know as the Excess Defense Articles (EDA). The United States equally provides military training to many foreign countries under the military funding program.[7] The stated goal is to promote U.S. national security by contributing to regional and global stability, strengthening military support for democratically-elected governments and containing transnational threats, including terrorism and tracking in narcotics, weapons, and persons. These grants enable allies and

[5] See Comola (2012) for a recent study on the determinants of bilateral arms trade. She suggests that changes in (domestic) political conditions affect the quantity of major conventional weapons supplied to third countries.

[6] An anecdotal example dates back to 1981, under the Regan administration, when "the political elite in Pakistan wanted to put the United States on the line and test U.S. friendship by seeing if America would alienate the Indians and go ahead with the F-16 transfer. They won the day, and U.S.-Indian relations entered a very tricky period" (Kemp, 1994, p.151). Things did not substantively improve until 1987, when the U.S. finally agreed to let India buy high technology military items (Kemp, 1994).

[7] USAID Economic Analysis and Data Services (2012): US Overseas Loans and Grants, Obligations and Loan Authorizations Greenbook http://gbk.eads.usaidallnet.gov/

friends to improve their defense capabilities and foster closer military relationships between the U.S. and recipient nations. According to the relevant literature on foreign military financing, this type of military aid can be effective in inducing states to adhere to U.S. foreign policy objectives (Alesina & Dollar, 2000; Palmer & Morgan, 2010). In exchange for military equipment or training, the USA could require recipient states to support U.S. foreign policy (Meernik *et al.*, 1998). Indeed, strategic and political priorities are shown to be among the main drivers of the U.S. military aid decision-making process (Poe & Meernik, 1995). While military aid has been shown to undermine the quality of institutions in the particular in the context of Colombia (Dube & Naidu, 2010), recent findings suggest that while military aid may not be effective at disarming terrorist groups, it can be effective at keeping terrorist groups out of power (Bapat, 2011), thus making this tool one of the most persuasive in matters of foreign policy. In the aftermath of WWII, only the U.S. retained the strength to challenge the expansion of the Soviet power. The massive rearmament program of the Western world was largely financed by the U.S, and is an expression of American foreign policy. During the Cold War, the U.S. used foreign aid to counter international threats by granting assistance to win or maintain allies and to help countries fighting Soviet proxies. Throughout this period, the U.S. competed with the Soviet Union for arms provisions to the Middle East and South Asia (see Figure 1). In most of the wars fought between the 1960s and the 1970s (e.g. the Vietnam, the Indo-Pakistan, the Arab-Israeli and the Algerian-Morocco wars), foreign arms, or restrains on arms supplies, played a central role in determining the fortune of the combatants.

Central American countries were also of particular concern to U.S. foreign policy-makers, in part because of their location but also owing to the perceived threat of increasing Cuban and Soviet influence in the region (e.g. in Nicaragua). In fact, U.S. military supplies were instrumental in winning the Cold War, to assure Israel's qualitative edge and to deny the Arab coalitions any prospect of military victory (Kemp, 1994). Following the end of the Cold War, several types of aid were granted to states under this program; from counter-narcotics assistance provided to Colombia to the provision of helicopters to Pakistan's military. Arms supplies and military assistance are interesting because they entail a long lasting relationship between the supplier and the buyer, in particular when the client has power but lacks technological skills: the recipient needs continuing and intensive support from the provider to

maintain and operate advanced equipment. Thus, the size of military assistance conveys important information about the quality of bilateral relations between the U.S. and the recipient country.

Each year since 1950, the U.S. Department of Defense has provided on its web site detailed information about the deployment of American troops around the world. The Heritage foundation collected and analyzed the data (Kane, 2006). On average, a stunning 22% of all U.S. Servicemen were stationed in foreign countries during 1950-2005, most of them in non-combat duties.. Over the same period, 53 countries have hosted at least 1000 American troops at one point. Some of these deployments have existed for nearly 50 years, in countries like Japan, Germany, and South Korea, while other deployments have more recent origins such as is the case of the current deployments in Australia and around the Horn of Africa. The bulk of U.S. troops have been concentrated in Europe (52% of troops deployed) and Asia (41%), while Africa and Middle East have hosted a smaller share of troops. For the most part, U.S. troops were stationed in allied countries, such as Japan, South Korea, and NATO members in the Cold War system of deterrence to contain communism. Forces in Europe were reduced by two-thirds after the fall of the Berlin Wall (see Figure 2). Troops sent to Korea in the early 1950s, to Vietnam during the 1960s and Iraq and Afghanistan in the 2000s saw active combat, yet in most instances the U.S. military performed a variety of non-combat duties, from anti-piracy operations, to peacekeeping and training with foreign militaries. Frequent deployments and joint military exercises during peacetime in the past in Italy, Germany, Morocco, Thailand, and currently in Egypt, Panama, Saudi Arabia, Singapore, South Korea, Turkey, and the United Arab Emirates indicate positive relations between the U.S. and host countries. More recently, Australia has agreed to host a full U.S. Marine task force. The deployment is being seen as a move to counter China's growing influence in the Pacific region. Since the general objective is to confront perceived contemporary threats and extend a security guarantee over a strategic region, we use the presence of troops to proxy the foreign-policy goals of the U.S. towards the country harbouring troops.

Accepting to host U.S. troops is a difficult political decision, which can cause domestic backlash if the benefits are not clear-cut. The opposition can easily gather domestic support against the "imperialistic ambitions" of the U.S. and the threats to national sovereignty.

Moreover, as a recent work by Azam & Thelen (2010) suggests, U.S. deployment may have a counterproductive impact on the number of terrorist attacks originating from the host-countries when these countries are oil-exporting. To support the security needs of friends and allies and strengthen security links, the U.S. can resort to alternative, less invasive, foreign policy tools. Foreign military aid could be thought as an effective substitute for this riskier policy and can be used to cross-check the validity of our theory. Before exploring whether an economic region over which the U.S. extended its security guarantees is more likely to shift its trade balance towards the U.S. and away from the rest of the world, and to what extent this special relation affects its exports towards the U.S., we propose a theoretical framework to clarify the exact causal mechanisms.

3. The Theory

We consider a very simple setting featuring a host country under the rule of a government, *g*. Domestic producers, *p*, trade their production with a third party that represents the U.S. The trade volume with the third party is denoted by the function $T(e,\delta)$. Trade is a positive and concave function of domestic producers' effort e, $T_1(e,\delta) > 0, T_{11}(e,\delta) \leq 0$, and a negative and convex function of transaction costs δ, $T_2(e,\delta) < 0, T_{22}(e,\delta) \geq 0$, where lower case numbers indicate partial derivatives. The cross derivative is assumed to be negative, $T_{12} < 0$, reflecting the fact that lower transaction costs increase the marginal production of trade. The host government may receive foreign military support, α, in which case the host country and the third party intervener become more closely tied from an economic viewpoint[8] eventually resulting in lower transaction costs, $\delta_1(\alpha) < 0$. Producing tradable products involves a cost of effort which is described by the function $c(e)$, where $c_1(e) > 0$, $c_{11}(e) \geq 0$. The government's total tax proceeds equals $tT(e,\delta)$ and the government aims at maximizing its citizens' well-being.

The government faces a security threat. We designate by s_g the government forces, and by s_f the opposition forces. Moreover, the U.S. can provide military support to the government, in which case the fighting efficiency of the host government is increased by a factor α. In case of government victory, domestic producers retain their trade benefits with the U.S., whereas in

[8] Such increased economic ties may result from cultural ties between the host country and the third party intervener, from increased common language speaking by trading partners, and networks effects.

case the government is defeated, the opposition forces appropriate these gains. The objective function of the population-centred government and of the opposition forces is given by the following expressions:

$$u_g = \frac{(1+\alpha)s_g}{(1+\alpha)s_g+s_f} T(e;\delta(\alpha)) - s_g \quad (1)$$

$$u_r = \frac{s_f}{(1+\alpha)s_g+s_f} T(e;\delta(\alpha)) - s_f \quad (2)$$

While the utility of domestic producers is given by:

$$u_p = \xi . T(e;\delta(\alpha)) - c(e) \quad (3)$$

where $\xi = \frac{(1+\alpha)s_g}{(1+\alpha)s_g+s_f} . (1-t)$, that is the probability of government victory times the net tax per unit benefit of trade.

The timing of the game is sequential. In a first stage domestic firms decide their production/trade levels. Then the government and opposition forces choose their security level. The government maintains the country's finances balanced, while the opposition forces are not budget constrained and simply aim at deriving a positive expected utility. We solve the game backwardly.

Maximizing (1) and (2) with respect to s_g and s_f, respectively, yields the following FOCs:

$$\frac{(1+\alpha)s_f}{\left((1+\alpha)s_g+s_f\right)^2} T(e;\delta(\alpha)) - 1 = 0 \quad (4)$$

$$\frac{(1+\alpha)s_g}{\left((1+\alpha)s_g+s_f\right)^2} T(e;\delta(\alpha)) - 1 = 0 \quad (5)$$

Combining expressions (4) and (5) we obtain that $s_g^* = s_f^*$, which, after replacing in either equation implies:

$$s_g^* = s_f^* = \frac{(1+\alpha)}{(2+\alpha)^2} T(e;\delta(\alpha)) \quad (6)$$

The associated probability of government victory is equal to $\left(\frac{1+\alpha}{2+\alpha}\right)$, and the budget-clearing tax rate imposed from the government on domestic firms equals:

$$tT(e;\delta(\alpha)) = s_g \Leftrightarrow t = \frac{1+\alpha}{(2+\alpha)^2} \quad (7)$$

Consequently, the value ξ in the objective function of domestic producers in stage 1 now reads as:

$$\xi = \left(1 - \frac{(1+\alpha)}{(2+\alpha)^2}\right)\frac{(1+\alpha)}{(2+\alpha)} \quad (8)$$

Optimizing (3) for the producers yields:

$$\xi . T_1(e^*;\delta(\alpha)) - c_1(e^*) = 0 \quad (9)$$

The total impact of α on the level of trade is determined by the next expression:

$$\frac{de^*}{d\alpha} = \frac{\partial e^*}{\partial \xi}.\frac{\partial \xi}{\partial \alpha} + \frac{\partial e^*}{\partial \delta(\alpha)}.\delta_1(\alpha) \quad (10)$$

It is immediate from Equation (9) to deduce that ${\partial e^*}/{\partial \xi} > 0$. Moreover, upon inspection of (8) we deduce that ${\partial \xi}/{\partial \alpha} > 0$. Observe next that since $T_{12}(e;\delta(\alpha)) < 0$, we can apply the implicit functions' theorem on (9) to obtain:

$$\frac{\partial e^*}{\partial \delta(\alpha)} = -\frac{T_{12}\left(e^*;\delta(\alpha)\right)}{\xi . T_{11}\left(e^*;\delta(\alpha)\right) - c_{11}(e^*)} < 0$$

Lastly, since $\delta_1(\alpha) < 0$, we can unambiguously conclude that the sign of (10) is positive. The next proposition summarizes our findings:

Proposition 1: *The higher the military support from the third party intervener to a host government, α, (i) the more secure the local producers will be, (ii) the higher the marginal profitability of the trade sector, and (iii) the less local producers will be taxed per unit of traded good. These combined effects result in higher production, e, and therefore larger trade flows.*

The first effect is very intuitive: since military aid translates in an enhanced efficiency of the government troops, the probability that the latter overcomes its adversaries when security concerns emerge is higher, and therefore local producers evolve in a more secure environment.

This in turn boosts the incentives to produce goods and to trade them.[9] Second, we have by assumption that more military aid tightens the ties between the host country and the third party intervener, thus enhancing the business environment and stimulating trade. Lastly, while more military aid translating in more trade because of the second effect implies that the government is more incentivized to invest resources in securing a violence-free environment, we can see in (7) that the tax base is increased by the same increment, thus cancelling this effect on the tax rate. A second effect is at play, however. The government troops being more efficient with military aid, at equilibrium both the government and the opposition are incentivized to reduce their security expenditures. This eventually pushes downwards the tax rate on domestic producers, thus incentivizing them to further increase the effort expanded in producing tradable goods.

4. Empirical analysis

4.1 Data source

Our study covers the period 1950-2009. Bilateral trade is drawn from the Correlates of War Dataset (COW), assembled by Barbieri *et al.* (2009). The dyadic trade dataset describes import and export data in current U.S. dollars for pairs of sovereign states. We also use disaggregated trade flows at the industry level, provided by Feenstra *et al.*, (2005).[10] Per capita military expenditure is also taken from the Correlates of War and will be used later on as an instrument for U.S. security provision. Information on GDP and per capita GDP are taken from the Penn World Table dataset (version 7.1) and are expressed in PPP at 2005 constant prices.[11] The list of gravity controls includes the classical impediments or facilitating factors such as bilateral distances, contiguity, colonial linkages, and common language dummies. All

[9] Notice that as α tends to infinity, the probability of government victory converges to unity, while security levels of both the host government and the opposition tend to zero. In other words, for high levels of military aid, the confrontation will be highly contained, eventually taking the form of minor violent episodes or tensions.

[10] The data are organized by the 4-digit Standard International Trade Classification, Revision 2, but are only available for 1962-2000. We use the main categories i.e., food, raw materials, energy products, chemicals, machinery and transport equipment and other manufactured goods.

[11] https://pwt.sas.upenn.edu/php_site/pwt_index.php

these variables come from the CEPII distance database.[12] Free Trade Agreements data come from Baier & Bergstrand (2007) and are supplemented by data from the WTO web site. U.S. troop deployment data come from the Department of Defense and are based on counts taken in the last month of the fiscal year. The dataset was assembled by Kane (2006). Data on military aid are drawn from the U.S. Agency for International Development.[13]All nominal variables, including data on military spending and trade, which are in current USD, are transformed into constant USD using the U.S. GDP deflator, with 2005 as the base year. The GDP deflator is taken from the US Bureau of Economic Analysis.

4.2. Benchmark Model

The gravity model has long been one of the most successful empirical models in economics to analyze trade patterns between states. The good fit and relatively tight clustering of the coefficients in the vast empirical literature suggest that underlying economic laws are at work. However, given that potentially each sale has multiple possible destinations and each purchase has multiple possible origins, a theory of the bilateral flows must account for the relative attractiveness of origin-destination pairs. Indeed, the fit of traditional gravity improves when supplemented with proxies for trade frictions, such as the effect of political borders and common language (Anderson, 2010, provides an excellent review of the theoretical and empirical issues behind the gravity model). Yet, diplomatic, strategic and military relationships between countries are likely to create networks that lower transaction costs, thus boosting trade. Political factors along with economic conditions encourage countries to trade with each other.

We begin the estimation of the effect of security provision on U.S. bilateral trade by using the conventional gravity model of international trade. The formulation used in this paper is the benchmark empirical model for this kind of exercise, and the specification can be derived formally from a general equilibrium model of production, consumption, and trade, as in Anderson & Van Wincoop (2003). However, instead of using the bilateral level of trade between the U.S. and the rest of the world, our dependent variable is the log of country

[12] http://www.cepii.fr/anglaisgraph/bdd/distances.htm

[13] USAID Economic Analysis and Data Services (2012): US Overseas Loans and Grants, Obligations and Loan Authorizations Greenbook, available at http://gbk.eads.usaidallnet.gov/

i's import from (exports to) the U.S. as a share of total country *i*'s import (export). The shares are used to capture changes in the relative trade flows between the U.S. and the host country.

The baseline model is specified as follows:

$$\log z_{it} = \mu_i + \mu_t + \mu_i + \lambda \log S_{it} + \beta X_{it} + \varepsilon_{it} \quad (11)$$

where *i* denotes the host/recipient country (i.e. hosting troops and/or aid), *t* denotes time. log S_{it} (i.e. security provision) is the log of troops deployed by the U.S. in country *i* at time *t* or the log of military aid provided by the U.S. to help country *i*. The matrix $\mathrm{X_{it}}$ includes the standard determinants of trade as used in the gravity equation literature, following Glick & Taylor (2010), but is not meant to be exhaustive. We include time-invariant dyadic variables such as geographic proximity (log distance, contiguity) and historical linkages (common language, ex-colony), and control for several characteristics of the host/recipient country (real GDP, per capita real GDP). Finally, following Tomz *et al.* (2007), we include the participation in Free Trade Agreements because they are viewed as creating opportunities for trade. The gravity equation also includes a full set of time dummies, μ_t that control for unobservable year effects that are common across the states. β and λ are coefficients and ε_{it} represents the other influences on bilateral trade, assumed to be well behaved.

Most studies use pooled, rather than panel estimators that may not adequately control for omitted country - or pair-specific - attributes or distinguish between the effect of military assistance on trade across country pairs and the effects over time. Another shortcoming that makes the gravity wrongly specified is the lack of multilateral resistance terms, or the importance of relative trade costs in determining trade flows (Anderson & Van Wincoop, 2003). Without their inclusion, the error terms are correlated with bilateral trade barriers. To deal with these issues all specifications of equation (11) include a vector of country fixed effects μ_i, so that our identification of security's impact depends only on the within-pair variation in trade and security provision, with full control for any time-invariant country characteristics.[14] However, even after removing mean state and common year effects it is possible that model 11 may still fail to capture unobserved and time-varying effects specific to a pair (e.g., shifts in U.S. foreign policy priorities, pair-specific political frictions) which are potentially correlated with

[14] Note that we proxy for the presence of multilateral resistance terms between trading partners through the inclusion of country and time fixed effects.

both the security level and the trade. We tackle this problem by adding country-specific linear trends to the baseline model so that the coefficient of security is free of any time varying unobserved effect.

4.2.1. Baseline results

Table 1 reports the estimated coefficients of the gravity model when the U.S. troop deployment is our proxy for the level of security transfers. We differentiate between (shares) of exports and imports. Throughout the paper we use Huber-White standard errors to address the potential problem of heteroskedasticity in the error terms. The traditional gravity equation is shown in columns (i) and (iv). The models also control for macro area and year effects (not reported).[15] The added control variables are economically and statistically significant with "standard" interpretations.

For instance, the U.S. trades more with economically larger countries. A common language encourages trade, as does a common ongoing Free Trade Agreement. FTAs can be interpreted as a way to reinforce bilateral economic relations. Canada and Mexico, that share territorial boundaries with the U.S., engage in higher levels of trade with the U.S. because transportation costs are lower than with non-neighbours. Our main coefficient of interest is the λ estimate of the effect of U.S. troop deployment on the shares of exports and imports. By looking at columns (i) and (iv), a 10% increase in the size of troops deployed increases the share of exports and imports by 1 percentage points and this effect is statistically significant at the 1% level. This is a quite large effect, as it amounts to almost one-third (one-fifth) of the effect caused by a similar increase in GDP on US exports (imports).

Columns (ii)-(iii) and (v)-(vi) provide further robustness checks. First, to address the likely omission of country-specific characteristics and/or the importance of relative trade costs in explaining the existence and the extent of the bilateral trade, we estimate models with country fixed effects. In so doing, however, the time-invariant covariates drop out (i.e. distance, contiguity, common language), because they are perfectly collinear with the country fixed effects. In column (ii), the estimated coefficients of the log of troop deployment is equal to

[15] The macro area dummies refer to the following six world regions: i) North Africa, Near East and South Asia; ii) East Asia and Pacific; iii) Sub-Saharan Africa, iv) Former Soviet Union, v) Europe; vi) America.

0.11, slightly larger than in the model which does not control for country fixed effects, and still statistically significant at 1% level. As expected, the introduction of the fixed effects lowers the significance of some explanatory variables, in particular those ones with small within-country variation.

Second, the models of columns (iii) and (vi) allow for a more complex structure of the pairs fixed effects by adding 166 and 178 pair-specific linear trends to the baseline specification, respectively. The coefficients of 0.07 and 0.05 show that after removing time-varying pair and common year effects an increase of 10% in the number of troops is associated with a 0.7 and 0.5 growth in the relative size of exports and imports with the United States.

Similar models where the military assistance is measured by the U.S. disbursement of military aid in the form of money and weapons are found in Table 2. Results are organized as in Table 1, i.e. columns (i) and (iv) show the estimates of the traditional gravity equation, columns (ii) and (v) control for country fixed effects, and columns (iii) and (vi) include country-specific linear trends. U.S. military aid positively contributes to the shares of exports and imports to/from the U.S. A 10% increase in the amount of military aid transferred to country *i* is directly linked to an increase of the relative trade flow between 0.6 and 1.1 percentage points, with similar magnitude of troop deployment.

In Tables 3 and 4 we provide additional robustness checks. In particular, we estimate fixed effects models but exclude countries at war with the US (e.g. Vietnam, Iraq) and the member states of the Warsaw Pact (see columns (i) and (iv)). We exclude countries at war because we are principally interested in identifying the effect of changes in U.S.-to-countries security relations on bilateral trade flows in times of peace. The intuition behind the exclusion of members of the Warsaw Pact is straightforward: the U.S. was mostly unable to provide military assistance to countries belonging to the Soviet bloc, and at the same time did not engage in significant trade with them. Moreover, as we have seen in Section 2, a number of countries such as Germany, Japan, Saudi Arabia and South Korea, are both major recipients of military assistance and among the largest trading partners of the United States. To dismiss the possibility that our results are driven by a small number of aid recipient/commercial partners, we exclude top security recipients (columns (ii) and (v)) and top trading partners (columns (iii) and (vi)). Top security recipients and top trading partners are those lying above the 95th

percentile of the troop distribution and above the 95th percentile of the bilateral trade distribution respectively, for at least one year over the period 1950-2005. As we can see in Tables 3 and 4, the size and the statistical significance of both troop deployment and military aid remain mostly unchanged, suggesting that our results are robust and are not driven by the inclusion of these countries. Surprisingly, when we exclude top troop recipients, there is a large increase in the coefficient of troop deployment, in both the export and the import equations.

Even though the results provide empirical support to our security-induced trade theory, the estimates of our main coefficients of interest λ, in equation 11, are most certainly contaminated by reverse causality, which will be duly addressed in the following section.

4.3. Dealing with reverse causality

A positive correlation between bilateral trade openness and the probability of hosting U.S. troops or being the recipient of military aid can arise from causality running both ways. Military aid or troops may be driven by the economic interdependence between countries. We implement an instrumental variable procedure by choosing an instrument correlated with the endogenous explanatory variables, i.e. U.S. security provision, conditional on the other covariates, but uncorrelated with the error term in the explanatory equation. An ideal candidate is the host country military spending per soldier. The rationale is the following: the "security umbrella" that the U.S. provides through its troop deployment or the annual military aid package should be negatively related to the level of domestic funding per soldier. The higher the level of military effectiveness of a recipient country, the lower the level of security provided by the U.S. in terms of weapons and troops. In fact, according to the U.S. Greenbook, one of the explicit aims of military assistance (which can be as high as the annual instalments of $1.3 billion to Egypt) is to make the recipients' armies a more capable, professional force. The same logic can be applied to the strategic deployment of troops, in the light of direct threats to the host country (and the security of the region). This mechanism is also coherent with our theoretical model, where U.S. military assistance and the host country investment in security are strategic substitutes. The literature on the effect of total military expenditure on economic growth is very sensitive to

the correct specifications and quite inconclusive (see Dunne & Smith, 2010), but there are no reasons to believe that *military expenditures per soldier* should be correlated with the *shares* of bilateral trade between the U.S. and the recipient country.

To further alleviate the issue of reverse causality we lag by 3 years and by 5 years the number of troops and the amount of military aid. We also use a 5-year moving average of the log of troop and military aid over the period *t-1* to *t-5.* Lagging troops or military aid is another way of handling potential endogeneity.

4.3.1. Results

In Tables 5 and 6 we report the instrumental variable estimates when troop deployment and military aid are instrumented with the host country per capita military spending. Tables 5 and 6 also show the first-stage coefficients along with the customary first stage Kleibergen-Paap F statistic (p-value) and partial R^2 to verify the reliability of the chosen instrument. As one would expect the log of per capita military expenditures are strongly and inversely correlated with the log troop (aid) at a 1% level of statistical significance. In accordance with our prior, an increase in military expenditure per soldier reduces the U.S. military presence and the amount of U.S. aid. Furthermore, the Kleibergen-Paap F-test always rejects the null of weak identification of the first stage equation with a p-value of 0.000, as shown in parentheses. Taken together, these checks suggest the relevance of the host country military effectiveness at explaining the variance of the endogenous variable.[16]

The key variables of interest are the estimates of troop and aid. The size of the coefficient and the level of significance of the troop deployment provide encouraging empirical support to our theory. When we instrument the security provision, the size of the coefficients of troop and aid are larger than the previous estimates in Tables 1 and 2.

As we can see, using lagged values of the variables of interest, troops and aid, does not affect our results. In fact, their coefficients take on values that are consistent with our previous estimates, regardless of whether we lag by 3 years or by 5 years the number of troops and the

[16] To check whether our identification is driven by a small number of aid recipient/commercial partners, we re-estimate the models in column 1 of Table 5 and 6 by excluding top security recipients and top trading partners. We find the excluded instrument is still correlated with the endogenous regressor but only weakly, in particular when we omit top aid recipients. This was to be expected as the exclusion of top security recipients/top trading partners substantially reduces our sample size – we lose 2000 and 4000 observations respectively – and the 2SLS (IV) have well defined properties only for large samples.

amount of military aid or whether we use a 5-year moving average. Taken together, Tables 1 to 4 can offer lower and upper bound estimates of the effect of security concerns on the share of trade between the U.S. and the recipients. The estimated coefficient ranges from 0.05 to 0.16, implying that a 10% increase in military assistance causes an increase of the relative trade flow between 0.5 and 1.6 percentage points.

4.4. Industry level regressions

To explore whether the effect of military assistance on trade is restricted to some specific industries, for example those related to the defence sector (e.g., some subcategories of the manufacturing sector) we estimate separate regressions by industry sectors. This is particularly important if military aid takes the form of U.S. export of military items. Yet, if we observe a wider impact on U.S. imports and exports throughout all industries, this would suggest that our mechanism of security boosting trade results in a broad range of goods that are imported and exported. We use the 10 main sections included in the Standard International Trade Classification.[17] Results are shown in Table 7 and offer a final empirical confirmation of our theoretical priors. U.S. exports are significantly affected by its security strategy irrespective of the specific industry, which includes items as different as crude materials, animals and manufactured articles. On the opposite, U.S. imports from other countries show few notable exceptions. When security is measured by troop deployment, imports of chemicals and related products as well as food and live animals are insignificant, while when we use military aid, we find that food and live animals, together with machinery and transport equipment, are not affected by the U.S. security assistance. If anything, this final Table shows that the effect that the security strategy has on the economic interactions of the host/recipient states with the United States is broader that one could assume, and encompasses a variety of sectors, most of which are not related to military products.

5. Conclusions

Our paper aims to map possible connections between the security strategy of a country and its commercial ties, in times of peace and war. The U.S. has deployed more forces abroad and in

[17] Accordingly, only one section, "miscellaneous manufactured articles", contains a divisions "arms and ammunitions", which goes from armoured fighting vehicles to military weapons (e.g., mines, missiles).

more countries than any other military in the world history; it is also the largest contributor of military aid to foreign countries in the world. Both instruments of foreign policy have the same stated goal, contributing to regional and global stability and containing transnational threats and reflect national security goals. Most of the troops are harboured by allies. Similarly, the vast majority of unclassified military aid and assistance goes to friends.

Our results suggest that we are right to advance the relevance of political motivations behind bilateral trade; foreign policy goals affect trade flows between countries.

Establishing a close relationship between American security concerns and bilateral trade leaves open the question of whether troops/military aid cause trade or vice versa. We deal with the possibility of reverse causality, and demonstrate, by using an array of estimations of the gravity model, that our results are both theoretically and methodologically robust.

We show a clear pattern: security concerns affect the shares of bilateral trade flows between the U.S. and the rest of the world. Both imports and exports are equally affected and results hold across a number of industries, the majority of which are unrelated to the defence sector. This is likely to suggest network effects spreading throughout all industries. An interesting question is whether the cost of military assistance is worth the benefit of trade, in particular in terms of increased exports towards aid recipients. We can make a very simple cost-benefit analysis by looking at the values of military aid, which is a reliable partial measure of the cost of military assistance. We take a conservative estimate of the impact of US military aid on US exports and use the model in Table 2, column 2 (i.e., the benchmark estimate of U.S. exports which include country and year fixed effects). Accordingly, an increase of 10% in the real value of military aid is associated with a 1% growth in the share of imports of the aid recipient from the United States. We compute the predicted yearly average increase of the dependent variable using the estimated parameters from the model and translate this share in terms of (marginal) real value of imports of the aid recipient from the United States. Finally, we calculate the average benefits as the differences between the real value of the increment in imports and the real value of the increase in military aid. Figure 3 displays the evolution of the net benefits over the sample period. Speculatively, we can see that the marginal net benefits the U.S. receives in terms of additional exports to one country for an increase of 10% in military assistance are in the range of 10 - 70 million USD. This figure is quite substantial if we consider

that this is a marginal increase.

We put forward some theoretical explanations that account for the strong patterns elicited in the regression analysis, in particular a mechanism that explains relative bilateral trade as a consequence of increasing dependence on the U.S. security umbrella. Our corrected model specification, and the strong link forged between the theory and the empirical strategy, leads to a stronger relationship between trade and security than in traditional models. Scholars can and should endeavour to open the ``black box'' of foreign goals and look at domestic and governmental characteristics as well as the security-related factors that influence trade flows as a starting point to predict future trends.

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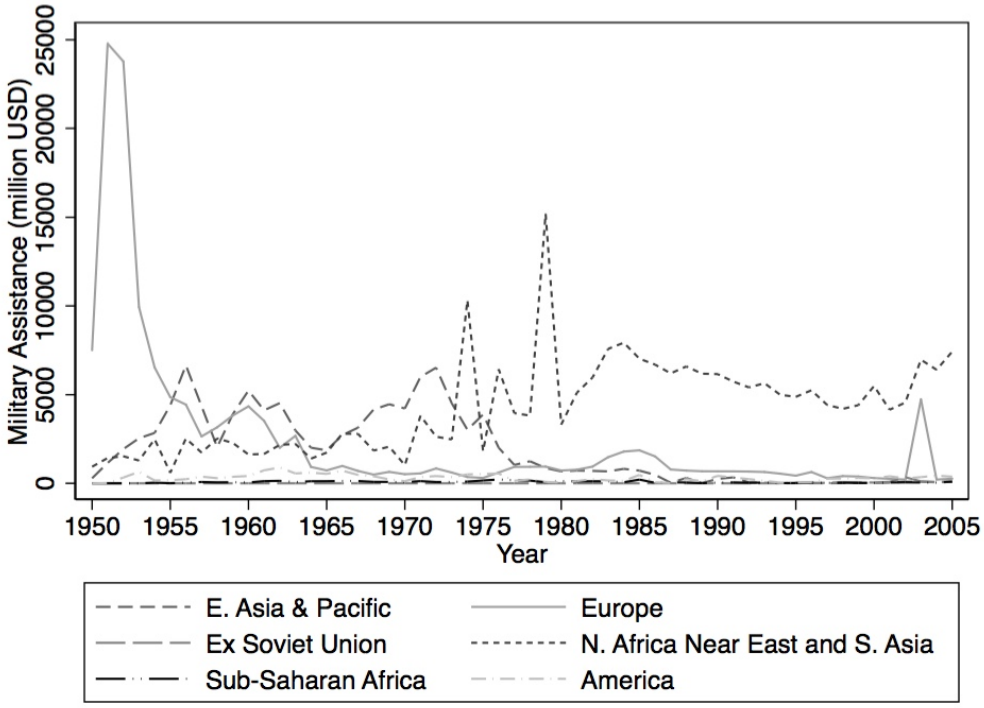

Figure 1: Military Assistance. Source: U.S. Agency for International Development

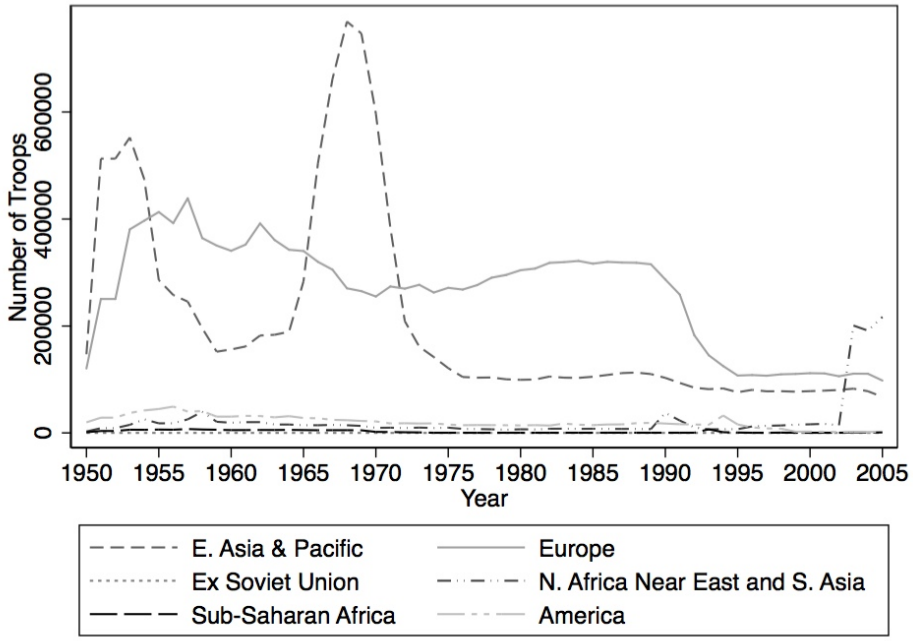

Figure 2: US Troops Overseas by Region. Source: Kane (2006)

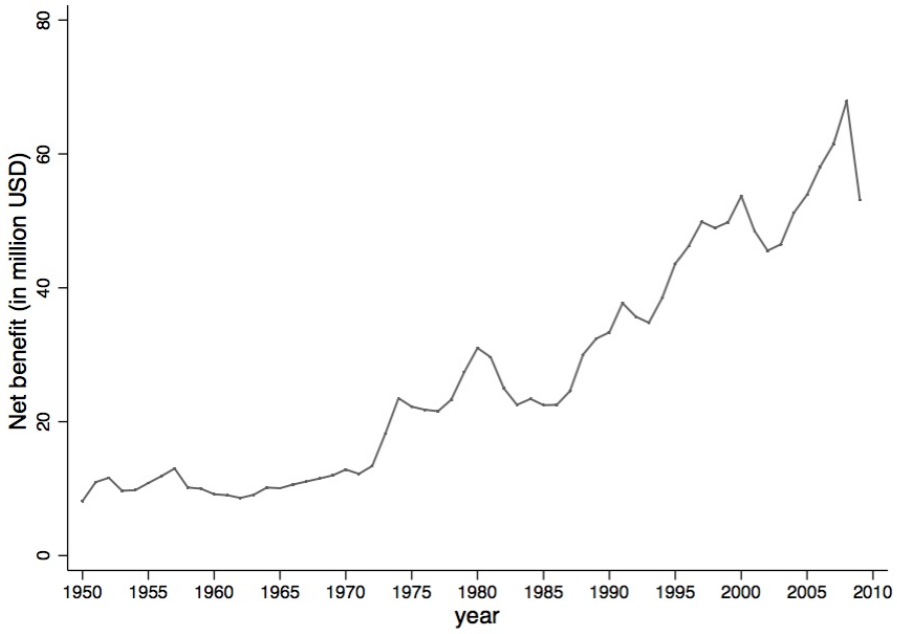

Figure 3: Evolution of the net benefits in terms of U.S. exports

Table 1. Benchmark estimates of US exports and imports. Security is Troop Deployment.

	US Exports			US Imports		
	i	ii	iii	iv	v	vi
log Troop	0.10***	0.11***	0.07***	0.11***	0.12***	0.05**
	(0.01)	(0.03)	(0.02)	(0.01)	(0.04)	(0.02)
log GDP	0.03***	-0.20	0.06	0.05***	-0.01	0.37
	(0.01)	(0.21)	(0.20)	(0.01)	(0.27)	(0.34)
log pcGDP	0.13***	0.67***	0.09	-0.06***	0.52*	0.11
	(0.02)	(0.20)	(0.25)	(0.02)	(0.27)	(0.33)
F.t.a.	0.35***	0.11	-0.05	0.76***	0.38	0.48
	(0.05)	(0.13)	(0.11)	(0.11)	(0.25)	(0.52)
log Distance	0.01			0.20***		
	(0.06)			(0.08)		
Contiguity	0.30***			0.46***		
	(0.11)			(0.13)		
Common language	0.25***			0.43***		
	(0.03)			(0.04)		
Former colony	0.70***			0.64***		
	(0.07)			(0.08)		
Macroarea FE	yes	no	no	yes	no	no
Country FE	no	yes	yes	no	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
Country-specific trend	no	no	yes	no	no	yes
N	6402	6402	6402	6380	6380	6380

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Ordinary least squares estimates given. Models (i) and (iv) include 5 macroarea dummies (i.e. Europe; Former Soviet Union; North Africa, Near East and South Asia; Sub-saharan Africa; America; omitted reference category is East Asia and Pacific). Models (iii) and (vi) include 166 and 178 country specific linear time trend respectively. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2. Benchmark estimates of US exports and imports. Security is Military Aid.

	US Exports			US Imports		
	i	ii	iii	iv	v	vi
log Military Aid	0.11***	0.10***	0.06***	0.10***	0.09***	0.02
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
log GDP	0.05***	-0.19	0.08	0.06***	0.06	0.44
	(0.01)	(0.20)	(0.19)	(0.01)	(0.25)	(0.32)
log pcGDP	0.20***	0.62***	0.19	0.04*	0.45*	0.04
	(0.02)	(0.20)	(0.27)	(0.02)	(0.27)	(0.31)
F.t.a.	0.22***	0.02	0.07	0.49***	0.22	0.29
	(0.05)	(0.11)	(0.09)	(0.08)	(0.23)	(0.30)
log Distance	-0.21***			0.09		
	(0.05)			(0.07)		
Contiguity	0.25***			0.65***		
	(0.09)			(0.11)		
Common language	0.22***			0.29***		
	(0.02)			(0.03)		
Former colony	0.90***			1.01***		
	(0.06)			(0.07)		
Macroarea FE	yes	no	no	yes	no	no
Country FE	no	yes	yes	no	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
Country-specific trend	no	no	yes	no	no	yes
N	7228	7228	7228	7206	7206	7206

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Ordinary least squares estimates given. Models (i) and (iv) include 5 macroarea dummies (i.e. Europe; Former Soviet Union; North Africa, Near East and South Asia; Sub-saharan Africa; America; omitted reference category is East Asia and Pacific). Models (iii) and (vi) include 166 and 178 country specific linear time trend respectively. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3. Robustness checks. Security is Troop Deployment.

	US Exports			US Imports		
	Exclude countries at war and Warsaw Pact	Exclude top security recipients	Exclude top trading partners	Exclude countries at war and Warsaw Pact	Exclude top security recipients	Exclude top trading partners
log Troop	0.11***	0.14***	0.10***	0.11**	0.16***	0.13***
	(0.04)	(0.05)	(0.03)	(0.05)	(0.06)	(0.04)
log GDP	-0.15	-0.23	-0.36	0.12	-0.07	-0.20
	(0.22)	(0.20)	(0.22)	(0.28)	(0.29)	(0.29)
log pcGDP	0.65***	0.84***	0.64***	0.51*	0.74**	0.45
	(0.21)	(0.20)	(0.21)	(0.29)	(0.29)	(0.28)
F.t.a.	0.07	-0.03	0.01	0.36	0.34	0.85**
	(0.13)	(0.14)	(0.09)	(0.25)	(0.35)	(0.40)
N	6095	5416	5153	6073	5394	5154

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Ordinary least squares estimates given. All models include country and year main effect. Top security recipients = countries lying above the 95th percentile of overall troop distribution. Top trading partners = countries lying above the 95th percentile of overall bilateral trade distribution. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Robustness checks. Security is Military Aid.

	US Exports			US Imports		
	Exclude countries at war and Warsaw Pact	Exclude top security recipients	Exclude top trading partners	Exclude countries at war and Warsaw Pact	Exclude top security recipients	Exclude top trading partners
log Military Aid	0.08***	0.06***	0.08***	0.06**	0.08**	0.11***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
log GDP	-0.16	-0.12	-0.43	0.17	0.23	-0.38
	(0.21)	(0.18)	(0.35)	(0.27)	(0.26)	(0.38)
log pcGDP	0.60***	0.71***	0.81**	0.42	0.45	0.67
	(0.21)	(0.19)	(0.35)	(0.28)	(0.29)	(0.41)
F.t.a.	0.03	-0.01	0.10	0.27	-0.06	0.72*
	(0.10)	(0.11)	(0.15)	(0.23)	(0.19)	(0.37)
N	6921	5270	2977	6899	5248	2977

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Ordinary least squares estimates given. All models include country and year main effects. Top security recipients = countries lying above the 95th percentile of overall troop distribution. Top trading partners = countries lying above the 95th percentile of overall bilateral trade distribution. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5. Two stage and ordinary least squares estimates of US exports and imports. Security is Troop Deployment.

	US Exports				US Imports			
	2SLS	3-year lag	5-year lag	5-year moving average	2SLS	3-year lag	5-year lag	5-year moving average
log Troop	0.73***	0.09**	0.07**	0.11***	0.52***	0.11**	0.10**	0.15**
	(0.14)	(0.03)	(0.03)	(0.04)	(0.15)	(0.05)	(0.05)	(0.06)
log GDP	-0.41***	-0.20	-0.19	-0.21	-0.17	-0.05	-0.08	-0.10
	(0.10)	(0.23)	(0.25)	(0.24)	(0.11)	(0.29)	(0.30)	(0.29)
log pcGDP	0.95***	0.67***	0.66***	0.69***	0.72***	0.55*	0.58*	0.61**
	(0.12)	(0.22)	(0.24)	(0.23)	(0.13)	(0.29)	(0.31)	(0.30)
F.t.a.	0.49***	0.09	0.10	0.12	0.61***	0.37	0.37	0.38
	(0.15)	(0.12)	(0.11)	(0.12)	(0.15)	(0.26)	(0.27)	(0.27)
				First Stage				
log pcMilex	-0.16***				-0.16***			
	(0.03)				(0.03)			
log GDP	0.31**				0.31**			
	(0.12)				(0.12)			
log pcGDP	0.36***				0.36***			
	(0.12)				(0.13)			
F.t.a.	-0.52***				-0.52***			
	(0.15)				(0.15)			
Kleibergen-Paap Wald F statistic (*pvalue*)	35.13 (*0.000*)				34.60 (*0.000*)			
Partial R^2	0.007				0.007			
N	5859	6056	5796	5793	5849	6036	5778	5775

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Two stage least squares and ordinary least squares estimates given. All models include country and year main effects. In 2sls models the log of troop is instrumented by the level of country military spending per soldier. 5-year moving average of the log of troop is the average over period t-1 to t-5. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Two stage and ordinary least squares estimates of US exports and imports. Security is Military Aid.

	US Exports				US Imports			
	2SLS	3-year lag	5-year lag	5-year moving average	2SLS	3-year lag	5-year lag	5-year moving average
log Mil.Aid	0.44***	0.08***	0.06***	0.10***	0.35***	0.08***	0.08***	0.11***
	(0.07)	(0.02)	(0.02)	(0.02)	(0.09)	(0.02)	(0.02)	(0.03)
log GDP	-0.51***	-0.17	-0.14	-0.16	-0.28**	0.09	0.13	0.12
	(0.10)	(0.21)	(0.22)	(0.20)	(0.13)	(0.26)	(0.27)	(0.26)
log pcGDP	1.12***	0.58***	0.55***	0.59***	0.90***	0.41	0.38	0.41
	(0.13)	(0.20)	(0.21)	(0.20)	(0.17)	(0.28)	(0.28)	(0.28)
F.t.a.	-0.53***	0.04	0.06	0.02	-0.20	0.21	0.22	0.19
	(0.16)	(0.10)	(0.10)	(0.10)	(0.17)	(0.23)	(0.23)	(0.23)
				First Stage				
Log pcMilex	-0.27***				-0.27***			
	(0.03)				(0.03)			
log GDP	0.93***				0.93***			
	(0.14)				(0.14)			
log pcGDP	-1.23***				-1.23***			
	(0.15)				(0.15)			
F.t.a.	1.55***				1.55***			
	(0.20)				(0.20)			
Kleibergen-Paap Wald F statistic (*pvalue*)	65.88 (*0.000*)				65.90 (*0.000*)			
Partial R^2	0.014				0. 014			
N	6050	7056	6931	6931	6040	7034	6909	6909

NOTE. – Dependent variable is the log of country i's imports from (exports to) the US as a share of total country i's imports (exports). Two stage least squares and ordinary least squares estimates given. All models include country and year main effects. In 2sls models the log of military aid is instrumented by the level of country military spending per soldier. 5-year moving average of the log of troop is the average over period t-1 to t-5. Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Ordinary least squares estimates of US exports and imports by industry.

		FLA	BTO	CMA	MIN	AVO	CHE	MFC	TNS	MSC	COM
US Exports	log Troop	0.10***	0.12***	0.08***	0.07***	0.15***	0.08***	0.10***	0.05***	0.09***	0.09***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	N	4491	3867	4257	3857	3699	4387	4370	4611	4432	4267
US Imports	log Troop	0.00	0.07***	0.07***	0.11***	0.04*	-0.02	0.06***	0.06***-	0.05***	0.08***
		(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
	N	3951	2594	3932	2179	1773	3138	3838	2889	3836	4096
US Exports	log Mil.Aid	0.13***	0.11***	0.11***	0.05***	0.13***	0.09***	0.10***	0.09***	0.11***	0.10***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	N	4483	3829	4225	3791	3636	4360	4347	4614	4418	4251
US Imports	log Mil.Aid	-0.00	0.17***	0.06***	0.04**	0.05**	0.03***	0.10***	0.01	0.07***	0.08***
		(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
	N	3961	2504	3883	2125	1722	3035	3802	2825	3770	4047

NOTE. – Dependent variable is the log of industry j in country i's imports from (exports to) the US as a share of total industry j in country i's imports (exports). Ordinary least squares given. Each coefficient is from separate industry regression. FLA = food and live animals; BTO = beverages and tobaccos; CDA = crude materials, inedible except fuels; MIN = mineral fuels, lubrificants and related materials; AVO = animal and vegetables oils, fats and waxes; CHE = chemical and related products; MFC = manufactured goods classified chiefly by material; TNS = machinery and transport equipment; MSC = miscellaneous manufactured articles; COM = commodities and transactions not classified elsewhere in the standard international trade classification (SITC). Huber-White robust standard errors in parentheses allow for arbitrary correlation of residuals within each country. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$